



EARTH ENVIRONMENTAL
& GEOTECHNICAL

Phase I GeoEnvironmental Desk Study

Hollingrove Farm

Ramsbottom

December 2021

On behalf of

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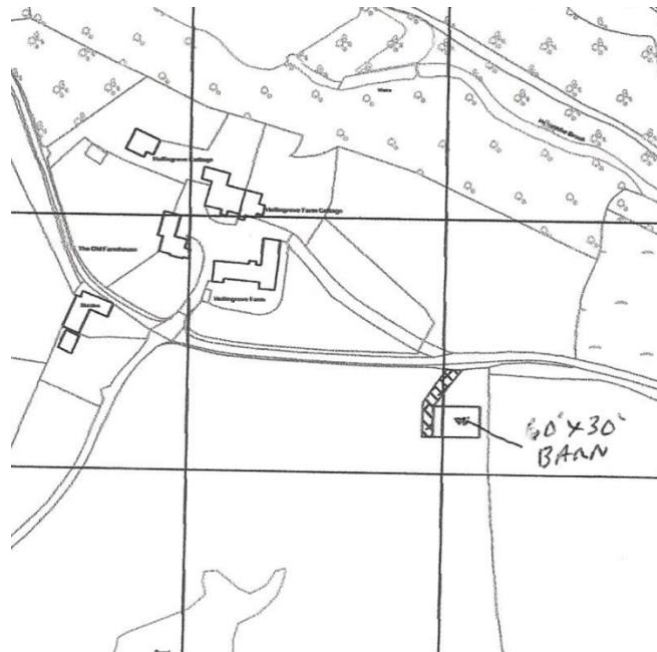
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1.0 INTRODUCTION

Appointment

- 1.1 Earth Environmental & Geotechnical Ltd has been commissioned by Mr. Jonathan Ofield, (the client) to undertake a Phase I GeoEnvironmental Desk Study for the proposed development at Hollingrove Farm, Bury.
- 1.2 A proposed development plan is shown below as Figure 1. The development consists of a new barn.

Figure 1 Development Layout Plan



Objective

- 1.3 The purpose of the Desk Study is to collate available geological and environmental data for the site (and its environment) and provide a preliminary geotechnical and geo-environmental appraisal, with a site-specific conceptual model. This enables a preliminary assessment of geo-environmental risks to be undertaken and, if necessary, provides information for the design of a Phase 2 Ground Investigation.

Scope

- 1.4 The Phase I Environmental Desk Study comprises of a site reconnaissance visit and a review of the following information sources, some of which was provided by the client.
 - British Geological Survey online maps.
 - Google Earth imagery.
 - Environment Agency online mapping data.
 - Historical Ordnance Survey maps.

- The site and surrounding areas environmental, geological and mining data presented in the site specific GroundSure Reports (Appendix 1).
- Coal Authority Interactive Viewer.
- Bury Council Planning Portal.

2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site is in Ramsbottom, Bury approximately 6km to the NW of Bury Town Centre. The approximate National Grid Reference for the centre of the site is SD 77189 15531 (X: 377228, Y: 415247) with the closest postcode being BL8 4HX.
- 2.2 The site consists of a rectangular shaped section of land (18m x 9.2m) and a proposed access road with current access from a gate off Redisher Lane to the north of the site. The site occupies an area of approximately 0.03hectares.
- 2.3 The area being developed consists of agricultural land in the form of a grass covered field.
- 2.4 The north of the site is defined by Redisher Lane, and beyond this is Holcombe Brook. The east of the site is bound by a fence a few metres away from the site boundary, beyond this fence fields continue. The site is in a rural setting with few dwellings found in the local area.
- 2.5 A location plan is shown below as Figure 2, together with a recent site photograph as Figure 3 (overleaf).

Figure 2 Site Location Plan



Figure 3 Site Photograph



Site Utility Services

- 2.6 Site service plans have been obtained for the site by EEG Ltd on behalf of the client. The status of all services should be checked prior to any development (including site investigation) commencing.

3.0 ENVIRONMENTAL SETTING

- 3.1 The geology of the site is covered by British Geological Survey (BGS) online data and the site specific GroundSure Enviro+Geo Insight report (Appendix 1).
- 3.2 Environmental conditions are covered by Environment Agency (EA) and British Geological Survey (BGS) online data, and the site specific GroundSure Enviro+Geo Insight report (Appendix 1).

Geology

- 3.3 The BGS states that the site is not underlain by artificial deposits or Made ground.
- 3.4 The site is underlain by superficial deposits of the Devensian glaciofluvial deposits comprising of sand and gravel.
- 3.5 The solid geology beneath the site is shown to be the Millstone Grit Group comprising of mudstone and siltstone.
- 3.6 There are 6no. records of linear features within 500m of the site boundary. The closest feature is a fossil horizon 58m north east of the site. Others include 2 inferred coal seams found 80m and 123m north east.
- 3.7 There is 1no. record of a landslip within 500m of the site boundary. This in the form of landslide deposits found 467m north east of the site.
- 3.8 There are no borehole records identified within 250m of the site.
- 3.9 The site is in an area where the hazard rating is very low with regard to collapsible deposits, landslides, shrink swell clays and running sands.
- 3.10 The hazard rating is negligible regarding dissolution of soluble rocks and compressible deposits.

Ground Workings

- 3.11 There are 9no. records of historical surface ground working features identified within 250m of the site boundary. The closest record refers to a reservoir located 128m NW of the site, dated 1948.
- 3.12 According to the BGS, there are no records of a British Pit within 500m of the site.

Mining and Other Underground Workings

- 3.13 The site is located within the specified search distance (1km) of an identified coal mining area. Reference to the Coal Authority Interactive viewer shows the site is located within a Development High Risk Area.
- 3.14 There are 2no. records for non-coal mining areas located within 1km of the site. One of these records is on site mineral vein exploitation. The BGS states '*Sporadic underground mining of*

restricted extent may have occurred. Potential for difficult ground conditions is unlikely and localised and are at a level where they need not be considered.'

- 3.15 There are no areas of brine extraction, gypsum extraction, tin mining or clay mining within 1km of the site.
- 3.16 There are no records for non-coal cavities or natural cavities identified within 500m of the site.
- 3.17 There are no records for historical underground working features identified within 1km of the site.

Radon Potential

- 3.18 Most of the property is not located in a Radon Affected Area, as less than 1% of the properties are above the Action Level, although a small section of the northern boundary is in an area where between 1% - 3% of properties are estimated to be affected. This percentage is low enough however that no radon protection measures are not required.

Hydrogeology and Hydrology

- 3.19 The superficial deposits are classified by the Environment Agency (EA) as Secondary A Aquifer. The Devensian Glaciofluvial Deposits has an Intergranular flow type with a very high to high permeability. The BGS states the following:

Secondary A: *'Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.'*

- 3.20 The Millstone Grit Group is classified by the Environment Agency (EA) as a Secondary A Aquifer with a fracture flow type and a low permeability. The BGS states the following:

Secondary A: *'Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.'*

- 3.21 The groundwater vulnerability and soil leaching potential of the site for soil surface and superficial geology has been classified as low vulnerability with a low leaching potential. The groundwater vulnerability and soil leaching potential for the bedrock geology has been classified as medium. The BGS states:

'Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

'Medium - Intermediate between high and low vulnerability

- 3.22 There are 11no. groundwater abstraction licence records within 2km of the site. The closest record refers to a historical borehole located 469m to the north east of the site.
- 3.23 There are 7no. surface water abstraction licence records within 2km of the site. The closest being for historical process water located 904m north west of the site.

- 3.24 There are 3no. potable abstraction licence records within 2km of the site. The closest is a historical borehole located 644m north east of the site.
- 3.25 The site is not located within a Source Protection Zone and is not located within 500m of a Source Protection Zone within a confined aquifer.
- 3.26 There are 5no. water network entries within 250m of the site. The closest is a permanent inland river located 96m north east of the site.
- 3.27 There are 3no. surface water features identified within 250m of the site.
- 3.28 There are 2no. records of a Water Framework Directive (WDF) surface water body located on the site. Both records are on site, and one refers to the River Irwell, and the other to the River Kirklees Brook.
- 3.29 There is 1no. record of a Water Framework Directive (WDF) groundwater body located on-site. The record refers to the Northern Manchester Carboniferous Aquifers which were a poor chemical rating in 2019.

Landfill & Waste Management Activity

- 3.30 There are no records for current Environment Agency/Natural Resource Wales landfill records within 500m of the site.
- 3.31 There are no records of historic Environment Agency/Natural Resource Wales landfill sites within 500m of the site.
- 3.32 There are no records of BGS/DoE non-operational landfill sites within 500m of the study site.
- 3.33 There are no records of a historical landfill site from the Local Authority and Historical Mapping Records within 500m of the site.
- 3.34 There are no records of a waste treatment, transfer or disposal site within 500m of the study site.
- 3.35 There are no records of current Environment Agency/Natural Resources Wales licensed waste sites within 500m of the site.

Industrial Land Use Information

- 3.36 There are 16no. records of potentially contaminative historical land uses identified within 500m of the site. The closest refers to unspecified ground workings dated 1948, 356m NW of the site. Other potentially contaminative land uses include bleach and dye works and unspecified commercial/ industrial use.
- 3.37 There are no records of current potentially contaminative land use identified within 250m of the site.
- 3.38 There are 2no. records of historical tanks identified within 500m of the site. The closest refers to an unspecified tank located 445m north east of the site.
- 3.39 There are no records of historical energy features identified within 500m of the site.

- 3.40 There are no records for current petrol or fuel sites within 500m of the site.
- 3.41 There are no records of historical petrol or fuel sites within 500m of the site.
- 3.42 There are no historical garage and motor vehicle repair site records identified within 500m of the site.
- 3.43 There are no National Grid high voltage underground electricity transmission cables within 500m of the site.
- 3.44 There are no National Grid high-pressure gas transmission pipelines within 500m of the site.
- 3.45 There are no historical railway and tunnel features identified within 250m of the site.
- 3.46 There are no historical railway lines identified within 250m of the site.
- 3.47 There are no current active railway line records identified within 250m of the site.
- 3.48 There are no underground railway lines or tunnels identified within 250m of the site.
- 3.49 The site is not within 500m of the route of the High Speed 2 rail project.
- 3.50 The site is not within 500m of the route of the Crossrail 1 rail project.

Environmental Permits, Incidents and Registers

- 3.51 The Groundsure Report includes records of environmental permits, incidents and registers within 500m of the site, which are summarised in Table 1 overleaf.

Table 1: Environmental Permits, Incidents and Registers within 500m of the Site

Permit/Incident/Register	Number
Historical Licensed Industrial Activities (IPC)	0
Part A (1) and IPPC Authorised Activities	0
Pollutant Release to Surface Waters (Red List)	0
List 1 Dangerous Substances Inventory Sites	0
List 2 Dangerous Substances Inventory Sites	0
Part A (2) and Part B Activities and Enforcements	0
Category 3 or 4 Radioactive Substance Authorisations	0
Licensed Discharge Consents	0
Planning Hazardous Substance Consents and Enforcements	0
Dangerous or Hazardous (COMAH and NIHHS) Sites	0
Sites Determined as Contaminated Land under Part 2A EPA 1990	0
Regulated Explosive Sites	0
Pollutant Release to Public Sewer	0
Substantiated Pollution Incidents (Category 1 and 2)	0

Pollution Inventory Substances, Wastes and Radioactive Wastes	0
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Environmentally Sensitive Sites

- 3.52 There are 2no. Sites of Special Scientific Interest (SSSI) within 2km of the study site. Both sites are the West Pennine Moors found 531m north east and 581m north respectively.
- 3.53 There are no Special Areas of Conservation (SAC) within 2km of the study site.
- 3.54 There are no Special Protection Areas within 2km of the study site.
- 3.55 There are no records of listed Ramsar sites within 2km of the study site.
- 3.56 There are 3no. records of Ancient Woodland within 2km of the study site. The closest being Dawes Bank Wood 174m east of the site.
- 3.57 There are 3no. records of Local Nature Reserves (LNR) within 2km of the study site. The closest being Redisher Wood 61m north east of the site.
- 3.58 There are no nitrate vulnerable zones located within 2km of the site.
- 3.59 There are no records of National Parks (NP) within 2km of the study site.
- 3.60 There are 2no. records of Greenbelt land within 2km of the study site, including the Merseyside and Greater Manchester Greenbelt located on site.

Ecology

- 3.61 An ecological assessment of the site falls outside the brief of this report. Where considered necessary, advice should be sought from an ecological specialist in this respect.

Archaeology

- 3.62 An archaeological assessment falls outside the brief of this report. Where considered necessary, advice should be sought from an archaeological specialist in this respect.
- 3.63 There are no records of World Heritage Sites or Scheduled Ancient Monuments within 250m of the site. There are however, 2 listed buildings 94m and 117m north west at Hollingrove Farm.

Potential Flood Risks

- 3.64 Detailed assessment of flood risks is outside the scope of this report. However, the site does not lie within 50m of an Environment Agency Flood Zone 2 and 3.
- 3.65 There are no examples of a historical flood event within 250m of the site.
- 3.66 There is no risk of flooding from rivers and sea (RoFRaS) within 50m of the site.
- 3.67 There are no records of flood defences or areas benefitting from flood defences within 250m of the site.

- 3.68 There are no records of areas used for flood storage within 250m of the site.
- 3.69 The highest risk of surface water flooding occurring on-site is 1 in 30 years is negligible.
- 3.70 The highest risk of groundwater flooding occurring on-site is low.

Previous Site Investigations

- 3.71 Earth Environmental & Geotechnical Ltd are not aware of any previous site investigations carried out for the site.

4.0 SITE HISTORY

- 4.1 The historical development of the site has been determined by reference historical plans and Google Earth imagery. The reviewed historical plans comprise only readily available records and may be limited; however, the information available to date indicates that additional searches are unlikely to add to our understanding of the site. The earliest available historical mapping covering the site dates to 1850.
- 4.2 The site history is summarised in Table 2, below, followed by selected extracts from maps and aerial photographs.

Table 2: Summary of Site History

Date	On-Site History	Surrounding Land Use History
1850 1:10,560	Site is unoccupied land.	Currently grade II listed farm buildings can be seen to the NW Cotton Mill is shown 100m North of the site Redisher Bleach and Dye Works located 550m SE of the site
1891 1:10,560	No significant change	Cotton Mill no longer labelled
1908-1909 1:10,560 1910 1:2,500 1927-1928 1:10,560	No significant change	Weir identified on Holcombe Brook 250m NW Reservoir located 100m NW of site
1937-1930 1:2,500 1948 1:10,560	No significant change	Overhead electricity pylons shown running Ne to SW 100m E of the site No significant change
1968-1969 1:10,560 1980 1:10,000 2001 1:10,000 2010 1:10,000	No significant change	Increased residential development 600m SW No significant change Saplin wood shown on maps 450m N

Date	On-Site History	Surrounding Land Use History
2021 Google Earth Imagery	Site is shown as unoccupied agricultural land	No significant change- matches descriptions given from maps

Figure 4 OS Map Extract 1891

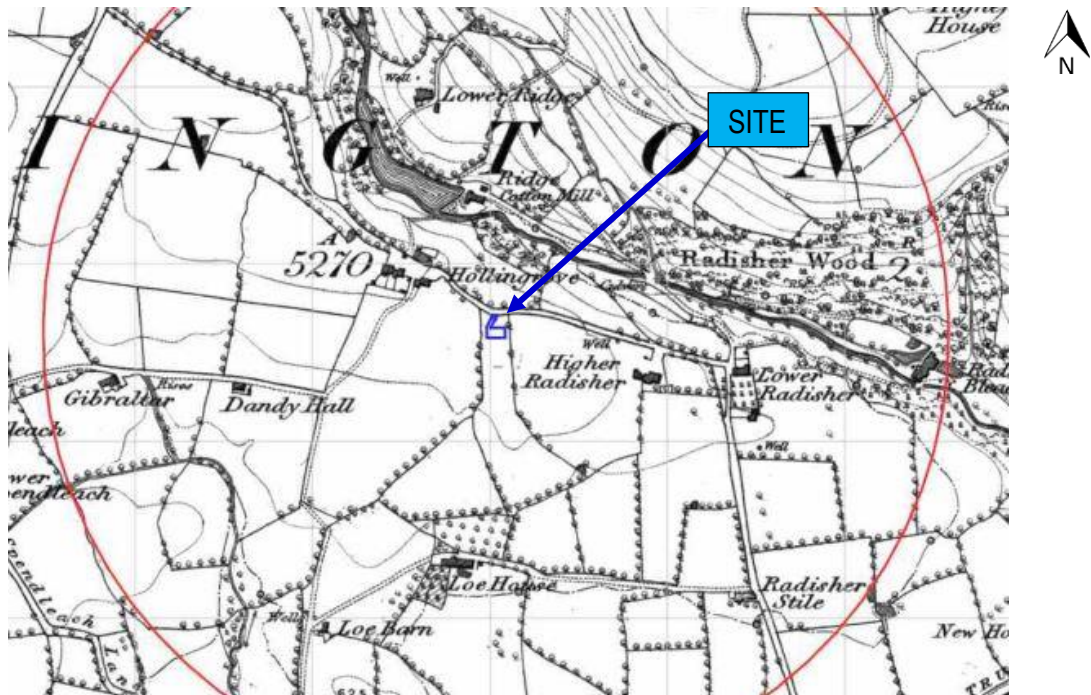


Figure 5 OS Map Extract 1937-1938

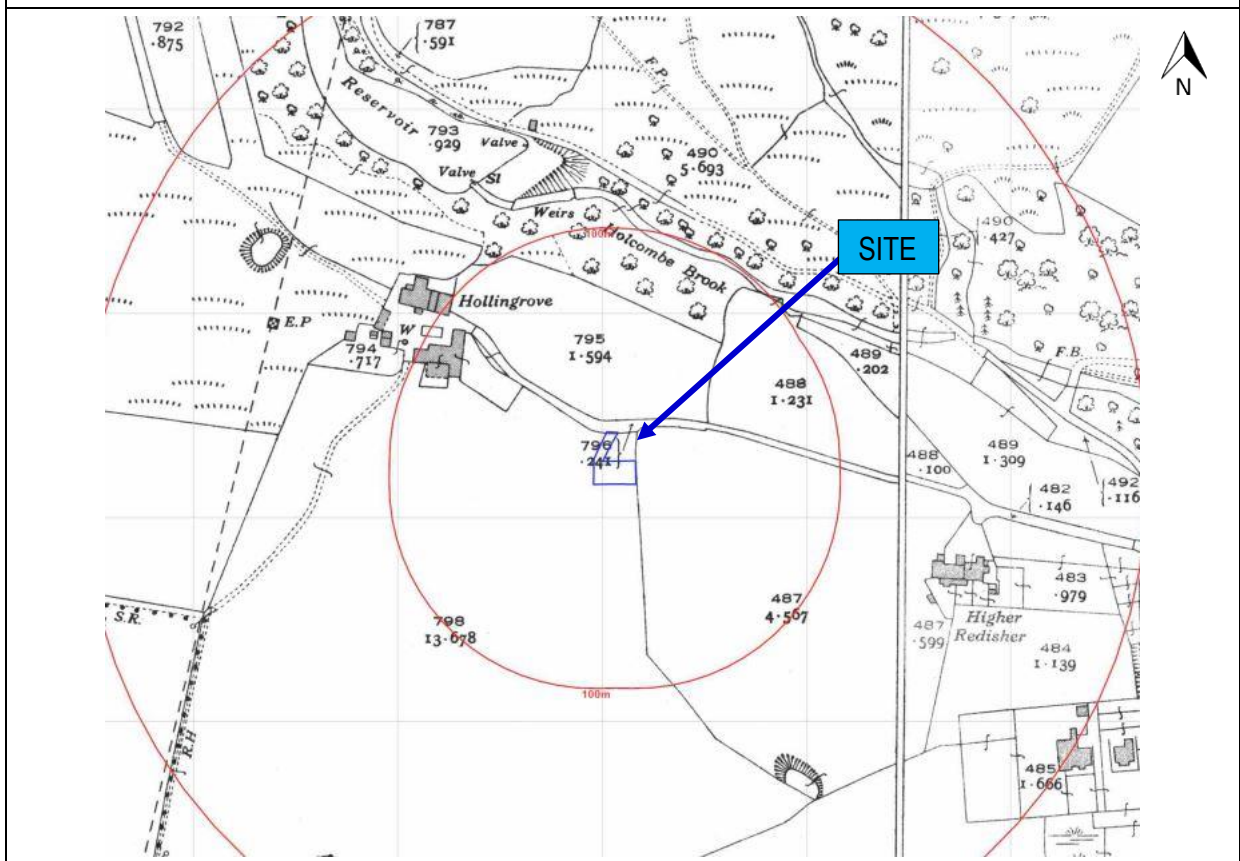


Figure 6 OS Map Extract 1980

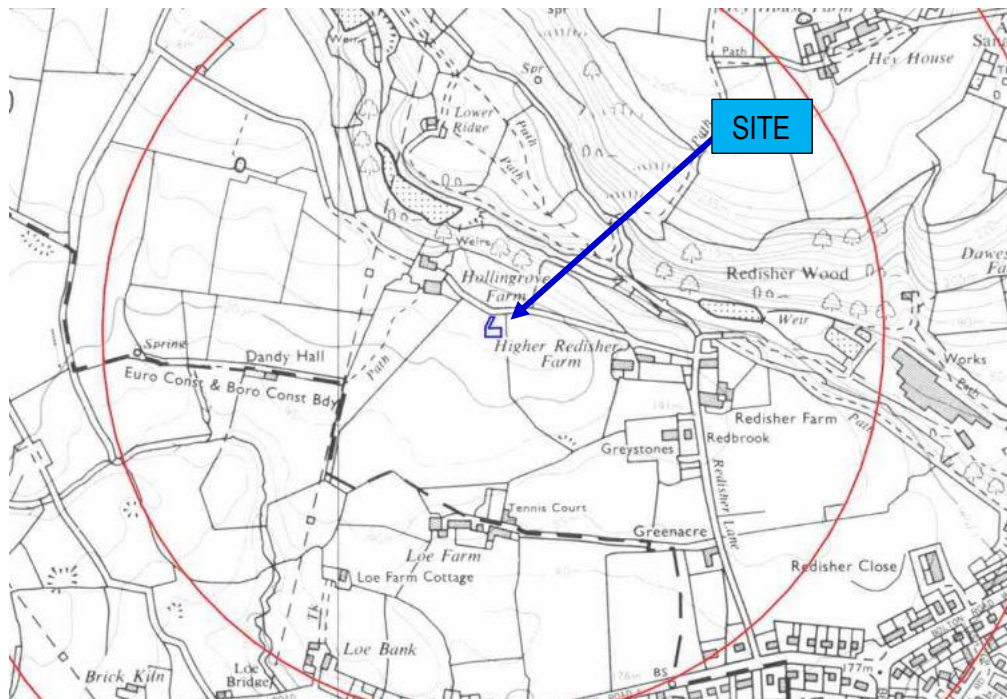
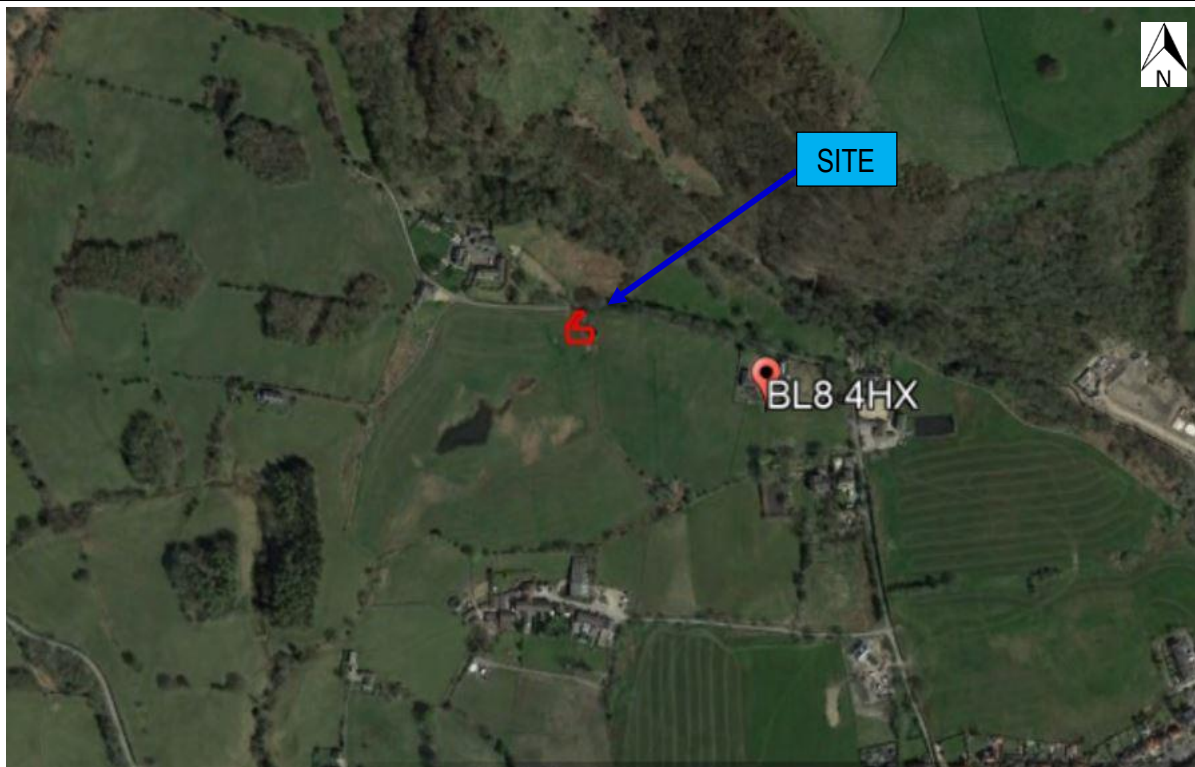


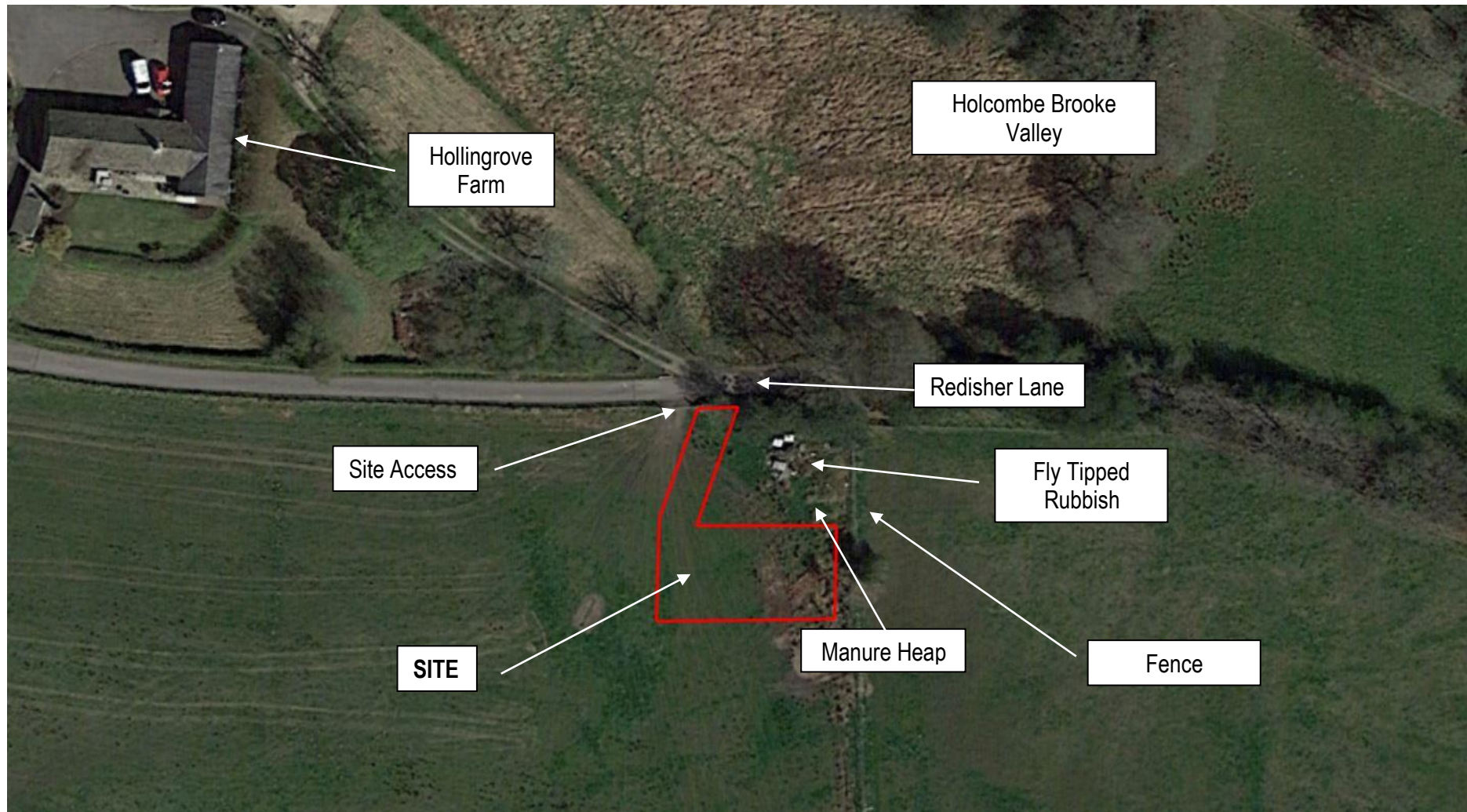
Figure 7 Aerial Photograph 2021



5.0 WALKOVER SURVEY

- 5.1 A walkover survey was completed on the 9th December 2021. The photographs and notes from this survey are appended to this report as Appendix 2 and Appendix 3 respectively.
- 5.2 The site is accessed via a metal gate on Redisher Lane at the northern most boundary of the site. The closest buildings are Hollingrove farm, 100m west along Redisher Lane.
- 5.3 The site is in the north east corner of a grass field. Adjacent to the site running east to west is Redisher Lane, and there is a fence running north to south along the site's eastern edge. Immature trees can be found along the road up until the metal gate, and two trees are located along the fence line.
- 5.4 The area within the site boundary is comprises of grass and no other material. There are three piles of manure and some fly tipped rubbish located just outside the site boundary to the north east of the field. This litter comprises of a 1000litre water butt, dismantled wooden sheds, some plastic wrapping and scrap metal.
- 5.5 The area within the site boundary has a gentle slope to the south west, however this slope becomes steeper after the site boundary and leads to standing water on the field 100m south west.
- 5.6 There is a piece of disused farm equipment in the field 30m south of the site boundary.
- 5.7 The Holcombe Brook River is located 150m north of the site in a steep valley on the other side of Redisher Lane.
- 5.8 A site features plan is presented as Figure 8 overleaf.

Figure 8 Site Features Plan



6.0 PRELIMINARY CONTAMINATION RISK ASSESSMENT

Introduction

- 6.1 The following paragraphs outline a Preliminary Risk Assessment (PRA) for the site based on the above desk study information as defined by DEFRA and the EA Model Procedures for the Management of Land Contamination, CLR11⁽²⁰⁰⁴⁾.
- 6.2 Table 5 provides a Preliminary Conceptual Model (PCM) which considers the source-pathway-receptor linkages present alongside the likelihood, severity and risk level as defined within Table 3 and Table 4 below. The assessment of probability, a modified risk table, and certain consequence definitions are based on CIRIA C552 and CLR11.
- 6.3 Table 5 considers whether a pollution linkage is potentially present and provides a preliminary qualitative assessment of risk based on the information currently available. Where a possible linkage is identified, it does not necessarily mean that a significant risk exists but indicates that further information is required through appropriate site investigation to substantiate the conceptual model.
- 6.4 The PCM/PRA is based on a proposed residential end use.

Table 3: Consequence, Probability and Risk

Probability	Consequence,	Risk
High Likelihood- There is a pollution linkage and an event either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution	Very High – acute risk to the human health likely to result in significant harm. Risk of severe or irreversible effect on ground/surface water quality. Catastrophic damage to buildings / property.	Very High – there is a high potential that the source-pathway-receptor scenarios may give rise to harm to human health, or the environment and remedial action is likely to be required.
Likely – there is a pollution linkage, and all the elements are present, which means that it is probable an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.	High – Severe or irreversible effect on human health. Temporary severe or irreversible effect on ground/surface water quality. Reduction of water quality rendering groundwater or surface water unfit to drink and/or substantial adverse impact on groundwater dependant environmental receptors.	High – it is likely that the source-pathway-receptor scenarios may give rise to an impact on human health or the environment, which may require remediation and/or control measures to mitigate risks
Low likelihood– there is a pollutant linkage and circumstances are possible for an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term	Moderate – Long term or short-term moderate effect on human health. Moderate effect on ground/surface water quality, reversible with time. Reduced reliability of a supply at a groundwater or surface water abstraction source	Moderate – it is possible that the source-pathway-receptor scenarios may give rise to an impact on human health or the environment, however it is either relatively unlikely that such would be severe, or if any harm were to occur it is more likely that harm would be mild.
Unlikely – there is a pollution linkage, but circumstances are such that it is doubtful that an event would occur even in the very long term.	Low – Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc.) Slight effect on ground/surface water quality, reversible with time. Marginal reduced reliability of a supply at a groundwater or surface water abstraction source.	Low – it is possible that harm could arise at the source, however it is likely that this would at worst be mild.
		Very Low – it is unlikely that the source-pathway-receptor scenarios will give rise to an impact on human health or the environment.

Table 4: Estimation of Level of Risk by Comparison of Consequence and Probability

		Consequence			
		High	Moderate	Low	Very low
Probability	High Likelihood	Very High	High risk	Moderate risk	Moderate to low risk
	Likely	High risk	Moderate risk	Moderate to low risk	Low risk
	Low Likelihood	Moderate risk	Moderate to low risk	Low risk	Very low risk
	Unlikely	Moderate to low risk	Low risk	Very low risk	Very low risk

Potential Sources

- 6.5 Historical maps have shown that the site has been used agriculturally since the 1850's, with the site walkover confirming this.
- 6.6 As a result, there is very limited potential for contamination from onsite or offsite sources.

Potential Receptors

- 6.7 The following receptors have been considered for the construction and operational stages of the proposed redevelopment.
- Current site users;
 - Adjacent land users;
 - Future land users;
 - Construction workers during site development works;
 - Groundwater within the underlying aquifer

Potential Pathways

- 6.8 The following pathways have been considered for the construction and operational stages of the proposed redevelopment.
- Dermal contact, ingestion, inhalation pathways of potentially contaminated soils;
 - Downward vertical migration of leachate to shallow groundwater;
 - Vertical or lateral migration of ground gas.

Table 5: Preliminary Conceptual Model

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
Potential ground contamination E.g., Heavy Metals, PAH, VOCs, TPH, and ground gases.	Dermal contact, ingestion and inhalation of soils dust	Current Site Users	Unlikely	Low	Very Low	The site is currently agricultural land with no dwellings. This means that very few people will be within the site boundary and only for short periods of time. Therefore, the risk is VERY LOW .
		Adjacent land users	Low Likelihood	Very Low	Very Low	The immediate surrounding areas are predominantly agricultural with some residential. Usual dust control measures should be implemented as part of good site working practices during construction to reduce dust generation. Therefore, the risk is considered VERY LOW .
		Future land users	Low Likelihood	Low	Low	The proposed development consists of a barn structure and access road. There is no made ground identified on the site. Therefore, the risk to future site users via direct exposure is VERY LOW .
		Construction Workers	Likely	Low	Moderate to Low	Construction workers may be exposed to potentially contaminated soils during construction works, however exposure duration will be short-term only. The risk to construction workers is considered MODERATE to LOW . Appropriate health and safety measures (in line with CDM and other relevant health and safety guidance) will reduce the risk to LOW .
	Downward vertical migration of leachate to shallow groundwater	Groundwater within the Underlying Aquifer	Unlikely	Moderate	Low	Leachable contaminants are unlikely to be present on site. The underlying soils are anticipated to be cohesive. The groundwater vulnerability and soil leaching potential are low, and the nearest current groundwater abstraction licence is 644m away. The risk groundwater is therefore considered LOW .
	Lateral migration in surface waters	Surface water	Unlikely	Moderate	Low	The nearest surface water feature is The River Holcombe Brook to the N. Therefore, the perceived risk to surface waters is LOW .
	Vertical or lateral migration of ground gas	Current Site Users	Unlikely	Moderate	Very Low	The site is not underlain by made or disturbed ground so ground gas is unlikely. As a result, the risk is VERY LOW .
		Adjacent land users	Unlikely	Moderate	Very Low	The immediate surrounding areas are predominantly agricultural and residential. The underlying soils are anticipated to be natural and cohesive which will inhibit ground gas migration. The site is in a Coal Development Authority High Risk Area, and as a result there is a small change mine gas could be present, however none has been recorded within 500m of the site. The risk to current site users from ground gas is therefore considered VERY LOW .

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
		Future land users	Unlikely	Moderate	Very Low	The proposed development consists of a barn structure. There are unlikely to be ground gas sources on site and modern construction practices will provide a barrier and ventilation. Therefore, the risk is considered VERY LOW .
		Construction Workers	Low Likelihood	Moderate	Low	Construction workers may be exposed to ground gas/depleted oxygen conditions in confined spaces and excavations; however, the duration will be short term. The risk to construction workers from ground gas is considered LOW .
Asbestos Containing Material (ACM)		Current Site Users	Unlikely	Low	Very Low	The current land use of the site is agricultural, with no current or demolished buildings found on or close to the site. The risk to current site users is VERY LOW .
		Adjacent land users	Unlikely	Low	Very Low	The immediate surrounding areas are predominantly agricultural with some residential. Construction may cause fibres to become airborne, however the desk study has indicated there is no made ground on the site and therefore the risk of asbestos is VERY LOW .
		Future land users	Unlikely	Low	Very Low	The barn should be constructed without using ACM as per current building practices. The site is unlikely to have any asbestos within any ground found on site. Therefore, the risk is VERY LOW .
		Construction Workers	Unlikely	Low	Very Low	Construction workers could be exposed to any fibres disturbed in the ground, however the lack of made ground on the site has reduced this risk to VERY LOW .

7.0 GEOTECHNICAL HAZARDS ASSOCIATED WITH THE DEVELOPMENT

7.1 In addition to the environmental hazards there are also geotechnical hazards associated with the stability of the ground including load bearing capacity, slope stability and effects of ground mining activities. Local Authorities follow NPPF (2012) which requires that a site is suitable for its new use considering of ground conditions and land instability, including from natural hazards to former activities such as mining. A summary of the geotechnical considerations is provided below in Table 6.

Table 6: Summary of Geotechnical Hazards

Geohazards:	
Highly Compressible Ground	Negligible risk
Collapsible Soils	Very low risk
Swelling Clay	Very low risk.
Running Sand	Very low risk
Ground Dissolution	Negligible risk
Landslip	Very low risk
Mining & Quarrying	No mining or quarrying is recorded as taking place on site. The site is located within a Coal Mining Reporting Area and a Development High Risk Area.
Geotechnical Design Considerations	
Site Clearance	The site is vacant.
Trees	There are no trees found onsite, but some located near its north eastern boundary.
Existing Buildings/Obstructions	There are no existing buildings or obstructions found on the site.
Foundations	The depth and type of proposed foundations would depend on the ground conditions present on site. The surface geology of the site comprises of superficial deposits of Devensian Glaciofluvial Deposits of sand and gravel. An intrusive ground investigation is recommended prior to any construction works taking place to discover the most suitable foundation options for the site and to make sure the ground conditions are the same across the entire site.
Geotechnical Design Considerations	
Floor Slabs	Again, an intrusive geotechnical investigation is recommended prior to any construction works to discover the most suitable floor slab design for the on-site ground conditions.
Groundwater	Exact groundwater conditions are not known at this stage. For more detailed knowledge of the groundwater regime, an intrusive investigation would be needed. However, it is recorded that the site is underlain by a Secondary A Aquifer.

	The highest risk of groundwater flooding on site is recorded as low.
Earthworks	Due to the slope present on site, earthworks may be required.
Slopes	There is a gentle southerly slope on site.
Retaining Walls	There are no retaining walls present on site.
Chemically aggressive ground conditions	Chemically aggressive ground conditions are not expected at this site. However, an intrusive geotechnical investigation would be necessary to confirm this.

8.0 CONCLUSIONS & RECOMMENDATIONS

Conclusions

- 8.1 The site is a vacant area of agricultural land.
- 8.2 It is understood that the client wishes to construct a barn on the plot with access remaining from Redisher Lane.
- 8.3 There is limited potential for contamination on the site.
- 8.4 The site is underlain by superficial deposits of Devensian Glaciofluvial Deposits, comprising of sand and gravel (Secondary A Aquifer and the solid geology of the Millstone Grit Group comprising of mudstone and sandstone (Secondary A Aquifer).
- 8.5 The overall risk from soil contamination to end users and construction workers is concluded to be **VERY LOW**.
- 8.6 The risk to controlled waters is concluded to be **LOW** based on the low leaching potential and low groundwater vulnerability.
- 8.7 The risk from ground gas to end users and construction workers is **VERY LOW** due to the natural ground on site.
- 8.8 The site is not located within a Flood Zone 2 or Zone 3; however, the risk of groundwater flooding is **LOW**.
- 8.9 The site lies within a Coal Authority Development High Risk area.

Recommendations

- 8.10 An intrusive investigation should be undertaken to establish geotechnical parameters for the design of foundations, floor slabs and pavement construction for the proposed new structures and surrounding area.
- 8.11 This report should be read in conjunction with an Earth Environmental & Geotechnical Coal Mining Risk Assessment.

APPENDIX 1

GROUNDSURE REPORTS

APPENDIX 2

SITE PHOTOGRAPHS

Earth Environmental & Geotechnical Ltd Tel: 0161 975 6088 Email: info@earthenvironmental.co.uk Web: www.earthenvironmental.co.uk	SITE PHOTOGRAPHS 
Job No.: A4460/21	Site: Hollingrove Farm, Ramsbottom
Plate 1 View facing S shows site access from Redisher Lane	Plate 2 View facing NE showing site entrance, Redisher lane, Eastern fence boundary and associated trees. Fly tipped rubbish is also shown in front of the tree line
	
Date: 9th December 2021	Date: 9th December 2021
Plate 3 View facing NW showing Redisher Lane to Hollingrove Farm	Plate 4 View facing SW shows slope away from site to standing water on lower field
	
Date: 9th December 2021	Date: 9th December 2021

Earth Environmental & Geotechnical Ltd Tel: 0161 975 6088 Email: info@earthenvironmental.co.uk Web: www.earthenvironmental.co.uk	SITE PHOTOGRAPHS 
Job No.: A4460/21	Site: Hollingrove Farm, Ramsbottom
Plate 5 View facing W shows fly tipped rubbish up close	Plate 6 View facing E showing fly tipped rubbish and boundary fence
	
Date: 9th December 2021	Date: 9th December 2021

Plate 7 View facing E shows Hollingrove Farm and fence line	Plate 8 View facing S shows fence line and disused farm equipment
	
Date: 9th December 2021	Date: 9th December 2021

Figure 9 Site Walkover Photo Locations



APPENDIX 3

SITE WALKOVER NOTES

WALK OVER SURVEY REPORT

Site: Hollingrove Farm, Ramsbottom

Date: 9th December 2021

Job No: A4460

Undertaken By: Ashley Graham

Purpose of Site Walkover:

- 1) Provide further information for the Desk Study Report;
- 2) Identify potential contamination sources, pathways and receptors;
- 3) Identify geotechnical features and potential geohazards;
- 4) Determine locations for potential exploratory boreholes.

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Site Setting	Description required for: Town/Country/Suburb Setting Industrial/Residential/Retail Usage Current Site use (if undertaking security and access to the site)		Rural farmers field Site is a grass covered section of field, close to Hollingrove Farm
Evidence of Past Activities	Are there: Any relevant street names in area? Features or relics, which indicate past history?	Yes/ No Yes /No	Access from the N of the site from Redisher Lane
Geographic Setting	Description required for: Low lying flood plain/dry valley/rolling hills etc.		The site is at the top of a hill, with a sloping field to the S and the Holcombe Brook River Valley to the N
Ground Conditions	Is there any evidence of: Mining, Mine entries Subsidence Landslip/slope erosion Former investigation works	Yes /No Yes /No	None observed on the site walkover.
Topography	Description required for: Are there apparent differences between site and surrounding area? (If yes describe the presence of retaining walls, and slopes).	Yes/ No	Site slopes gently to the S, and then becomes steeper past the site boundary

	Is there evidence of Made Ground / Fill on site?	Yes /No	None observed on site walkover
Site Boundaries and Neighbours	Description required for: Type of boundary demarcation (if any) on each side of site, usage of adjacent land and name of industrial/commercial occupiers. Note any adjacent features such as water course and other potentially environmentally sensitive uses (residential, school, infirmary, SSSI etc.)		The site does not have a set boundary, however there is a fence along Redisher lane and close to the E boundary of the site The site is located on greenbelt land and there is a conservation area to the N of Redisher Lane. 2 listed buildings are found at Hollingrove Farm 100m W
Vegetation	Is there any vegetation/trees on or close to side (if yes describe locations, type, maturity, etc.)? Is there any evidence of poor health / distress?	Yes/No Yes/No	Tress and bushes can be found along Redisher Lane to the N. 2 Trees are found along the fence adjacent to the site.
Ground Surface	Are there areas of hardstanding and estimate the split between hard and soft cover? (If yes describe locations, types and conditions). Is the any evidence of any spillages or staining?	Yes/No Yes/No	Whole site is comprised of soft cover (grass) No evidence of spillages was observed on the site walkover.
Site Drainage	Are there any drain covers / soakaways (if yes describe locations)? Are there any outfalls/water courses on site (note the condition of water courses in open water courses? discolouration, odour, eutrophication, oily sheen, gas bubbling water, clear or cloudy) Where a watercourse runs alongside or crosses a site are there any differences in visible water quality upstream and downstream of the site?	Yes/No Yes/No Yes/No	None observed on site.

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Electrical Equipment	Are there any electricity sub stations on or adjacent to the site? Are there any electrical transformers, capacitors, pylons etc. on site?	Yes /No	None observed on site, however there are overhead cables 250m E of the site
Buildings	Description of Buildings, including age, state of repair, materials used in construction. Is there any evidence of asbestos construction materials e.g., roofing, insulation materials? Do any buildings have basements? Do any buildings have a boiler room (if yes, describe fuel type and storage arrangements)?	Yes/No Yes/No Yes/No	No buildings located on site
Landfilling	Is there any evidence of gas protection measures (gas protection measures (gas membrane, gravel-filled trenches, venting pipes, etc.)?)	Yes /No	Not observed on the site walkover.
Process Air Emissions	Point Source: Are there any stacks / vents / cooling towers / abatement equipment? Fugitive Source: is there any stockpiled material / windblown dust / vapour process?	Yes/No Yes/No	Not observed on the site walkover. Not observed on the site walkover.
Storage of fuels & Chemicals	Are there any drums / containers (if yes, describe quantity, full /empty, stored on hard standing / soft landscaping, bunding)? Are there any above ground fuel tanks (if yes, describe locations, volumes, how many, bunding, used / disused, condition?) Is there any evidence of underground fuel tanks (fuel pumps, covers, vent pipes, and condition).	Yes/No Yes/No Yes/No	None on site, however there was a large 1000L container 3m E of the site entrance
Accidents	In the event of a large spillage would runoff affect any vulnerable watercourse/culverts?	Yes/No	Nearest water feature is River Holcombe Brook 150N of the site

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Waste	Are there any waste skips present on site?	Yes /No	No skips visible during the site walkover.
	Are waste storage facilities adequate?	Yes/ No	No wastewater facilities on site
	Is there any litter/fly tipped material?	Yes/ No	None on site, but some old sheds/ scrap metal found 3m W of entrance
Atmospheric	Are there any fumes, odours originating from site or affecting site from neighbouring sites?	Yes /No	
Access / Further Investigations	If a Phase 2 Investigation is likely to be required, describe any access problems including headroom where relevant, services, overhead cables, restricted access areas, confined spaces, trafficked areas, etc. that are likely to affect investigation scope/techniques. Identify possible site office and storage locations. Identify possible water supply		Site is completely clear Site is in a large field so plenty of space for site offices Possible water supply from Hollingrove Farm
Site Environs	Are there any local features that could have a harmful influence e.g., landfill, industrial processes, railway land?	Yes /No	None observed.
	Are there any sensitive water features/courses near to the site?	Yes/ No	Nearest water feature is Holcombe Brook River 150m N of site. Some standing water located in field 100m SW of site
Local Knowledge / Anecdotal Evidence			N/A
Site Dimensions	Describe shape of Site in plan and measure dimensions.		The maximum dimensions of the site are 18.3m x 9.2m for the barn section. The total site occupies an area of 0.03ha.

APPENDIX 4

REPORT LIMITATIONS

LIMITATIONS

This contract was completed by Earth Environmental & Geotechnical Ltd based on a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with all reasonable skill, and care, bearing in mind the project objectives, the agreed scope of works, the prevailing site conditions, the budget and staff resources allocated to the project.

Other than that, expressly contained in the above paragraph, Earth Environmental & Geotechnical Ltd provides no other representation or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Earth Environmental & Geotechnical Ltd.

If a third party relies on this report, it does so wholly at its own and sole risk and Earth Environmental & Geotechnical Ltd disclaims any liability to such parties.

It is Earth Environmental & Geotechnical Ltd understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was an important factor in determining the scope and level of the services. Should the purpose for which the report is used, or the proposed use of the site change, this report will no longer be valid and any further use of, or reliance upon the report in those circumstances by the client without Earth Environmental & Geotechnical Ltd review and advice shall be at the client's sole and own risk.

The report was written in 2021 and should be read considering any subsequent changes in legislation, statutory requirements and industry best practices. Ground conditions can also change over time and further investigations, or assessment should be made if there is any significant delay in acting on the findings of this report. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of Earth Environmental & Geotechnical Ltd. In the absence of such written advice of Earth Environmental & Geotechnical Ltd, reliance on the report in the future shall be at the client's own and sole risk. Should Earth Environmental & Geotechnical Ltd be requested to review the report in the future, Earth Environmental & Geotechnical Ltd shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between Earth Environmental & Geotechnical Ltd and the client.

The observations and conclusions described in this report are based solely upon the services that were provided pursuant to the agreement between the client and Earth Environmental & Geotechnical Ltd. Earth Environmental & Geotechnical Ltd has not performed any observations, investigations, studies or testing not specifically set out or mentioned within this report.

Earth Environmental & Geotechnical Ltd is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, Earth Environmental & Geotechnical Ltd did not seek to evaluate the presence on or off the site of electromagnetic fields, lead paint, radon gas or other radioactive materials.

The services are based upon Earth Environmental & Geotechnical Ltd observations of existing physical conditions at the site gained from a walkover survey of the site together with Earth Environmental & Geotechnical Ltd interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and whilst Earth Environmental & Geotechnical Ltd have no reason to doubt the accuracy and that it has been provided in full of those it was requested from, the items relied on have not been verified.

No responsibility can be accepted for errors within third party items presented in this report. Further Earth Environmental & Geotechnical Ltd was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Earth Environmental & Geotechnical Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to Earth Environmental & Geotechnical Ltd and including the doing of any independent investigation of the information provided to Earth Environmental & Geotechnical Ltd save as otherwise provided in the terms of the contract between the client and Earth Environmental & Geotechnical Ltd.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable and as investigation excavations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and Earth Environmental & Geotechnical Ltd] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The normal speed of investigation usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site.